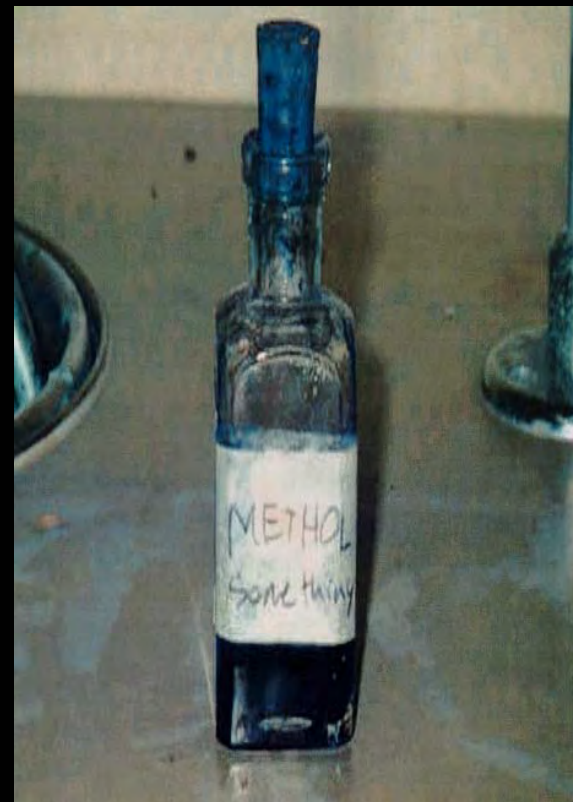


No More "*Methyl Something*" : Improving Management of Curriculum Chemicals in Schools

Maryann Suero, PhD
US Environmental Protection Agency
Region 5 (IL,IN,MI,MN,OH,WI)
Originally Presented at:
National Science Teachers Association
Chicago Regional Conference
November 10, 2005

suero.maryann@epa.gov
312-886-9077



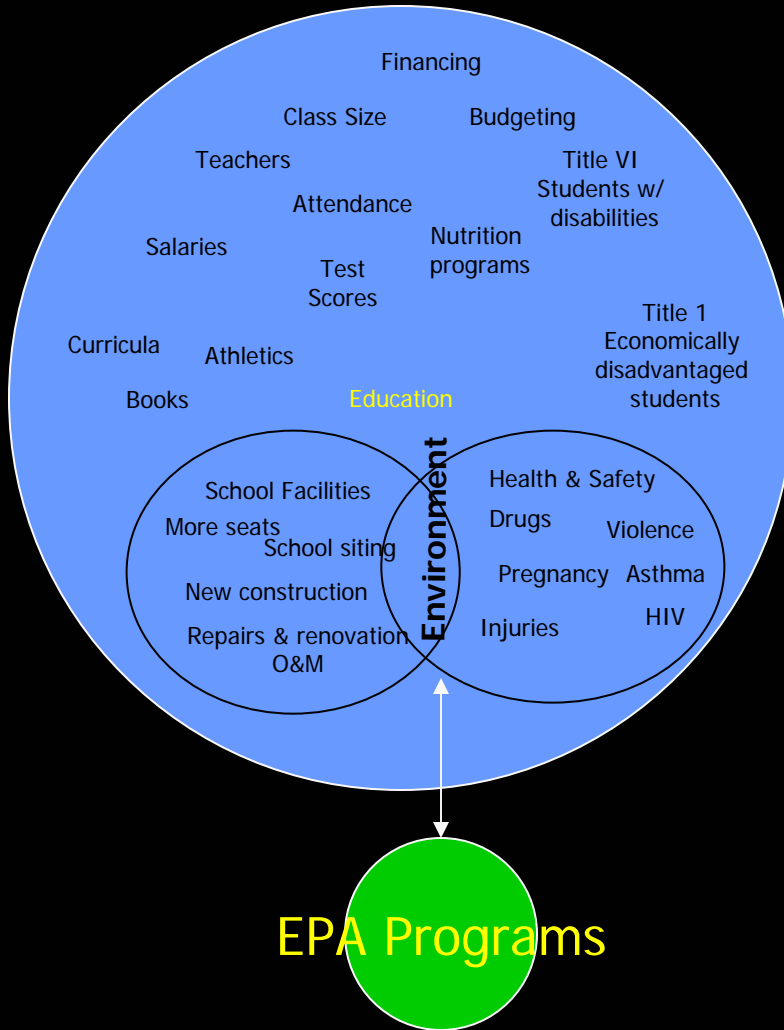
What Is Our Goal?

i.e. the commercial!

**EPA/Federal/State
Programs should support
Schools in their primary
Mission, which is educating
Kids!**

**Environmental (& health &
Safety) issues must be viewed
In context with each other**

**EPA & States & Partners
Provide tools (training, technical
Support, guidance) to schools**



And now....

More Information on Chemicals!

Where Are The Chemicals?

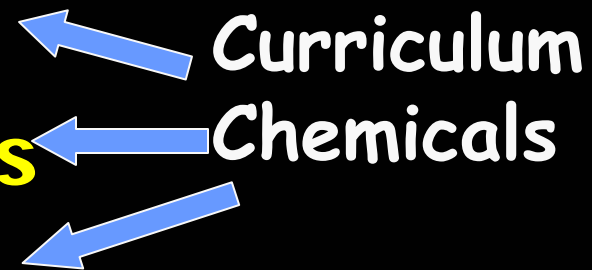
- Maintenance Areas

- Vocational Shops

- Science Laboratories

- Art Classrooms

- Offices



Why Be Concerned About Chemical Management?

- **Health hazards:** immediate & long-term
- **Safety hazards:** stability of shelves, storage methods and incompatibility
- **Environmental harm:** groundwater, discharges to streams/rivers, air pollution
- **Hidden costs/liabilities:** lawsuits, fines, Paperwork/fees, insurance premiums, etc

Types of Chemicals Posing Hazards in Schools

- Extremely flammable
- Corrosive
- Poisonous
- Carcinogenic
- ANYTHING STORED IMPROPERLY
- Reactive: explosive, heat generating, fume/vapor generating
- Unknowns

Examples : Poor Storage Practices

- Water reactives near / under sink
- Heavy containers on high shelves
- Corrosives on (corroded) metal shelves
- Flammables stored on wood
- Alphabetical storage (incompatible?)
- Unlabelled/"mystery" contents
- Chemicals next to food

Why are there problems with chemical management in schools?

- Lack of awareness
- Lack of environmental management system
- Lack of "somebody in charge" (add-on duty)
- Discount warehouse store effect
- Spend it or lose it monies

Why are there chemical management problems in schools? (contd)

- **Stockpiles from the 1950's – era of Sputnik and technology race**
- **Often little communication across Academic, Administrative, & Facilities departments**
- **Facilities often not built for handling chemicals (ventilation, storage problems)**

Incompatible Chemical Storage



Stockpiling/Overpurchasing and Underestimating Hazards



Poor Choice of Chemicals (high flammability material)



Metal shelving deterioration



Excess Chemicals in Storage



Special Case : Mercury

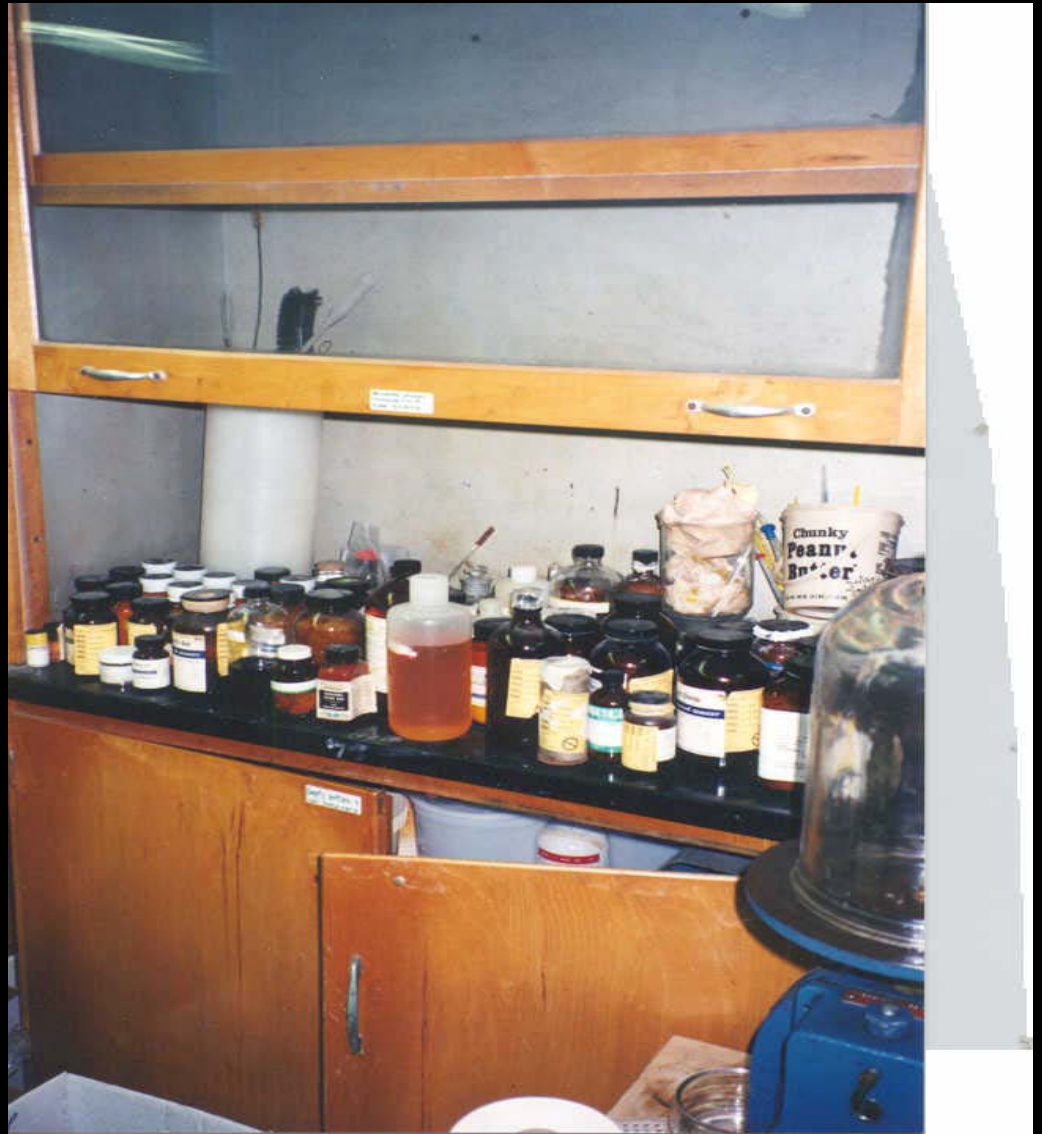


Special Case : Acutely Toxic



Imminent Risk Nitric Acid + Cyanide

Dysfunctional Fume Hood



**Nitric
"Sombbrero"**

or...

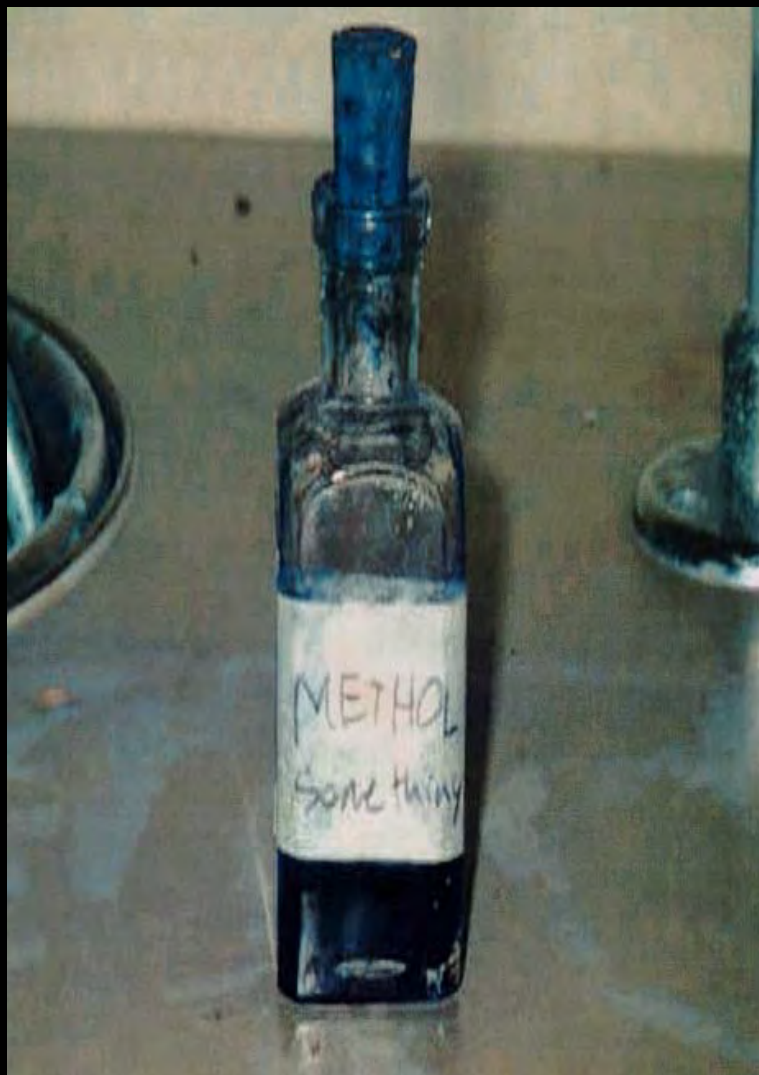
**Nitric
"Gnome"**



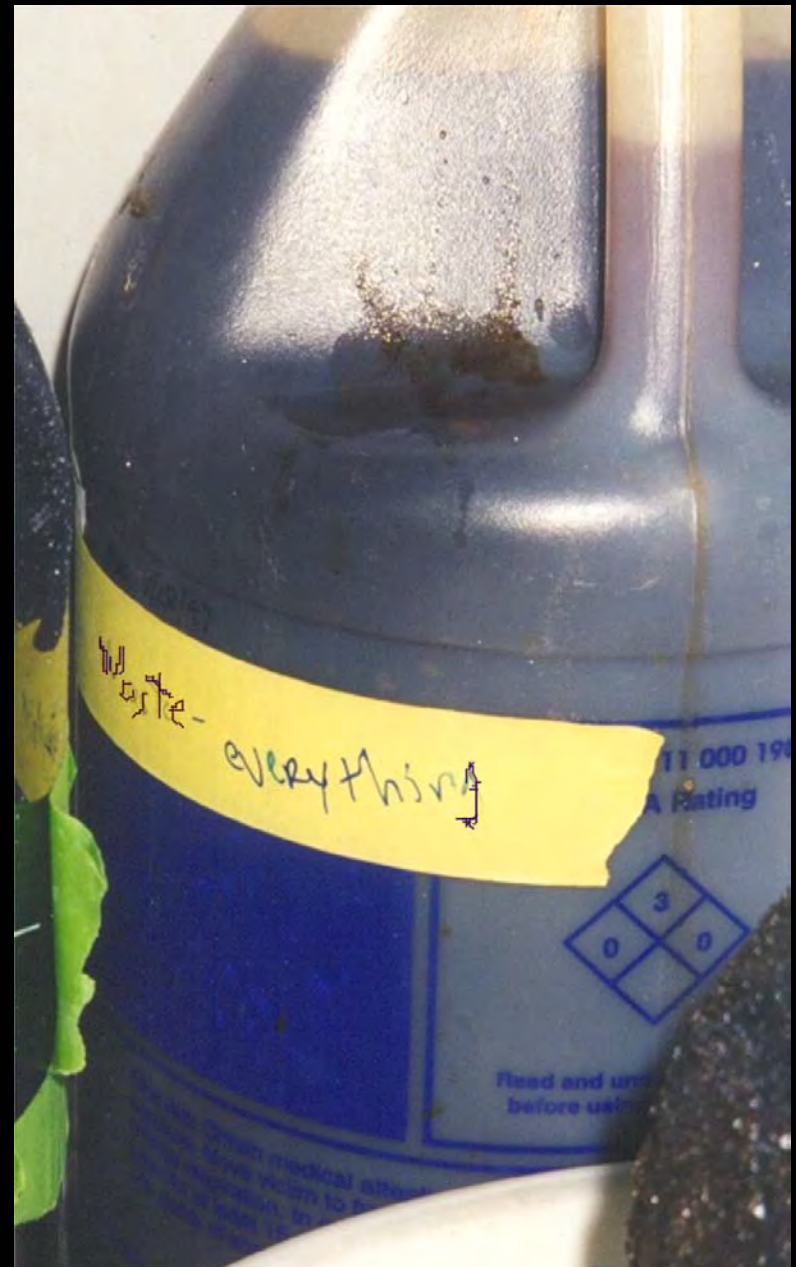
Improper storage of water reactive



At least we know it's organic....



What IS it????



You're Probably Already Convinced That the Situation Requires Action

- **Timeframe**
 - Short term
 - Longer term
- **Actors**
- **Actions**

Short Term Actions

- Learn about chemical hazards
today's presentation is just the first step
- May be requirements at various levels
 - Federal (e.g. OSHA HazCom, Chem RTK)
 - State
 - Local (e.g. building or fire code)
 - District

Short Term Actions

- **Build awareness in**
 - Administration
 - Business Officials
 - Purchasing
 - Facilities / Maintenance
- **Elements to build awareness of**
 - Issue is important
 - It needs attention
 - It needs funding

Short Term Actions

- **Work with professionals to identify hazards**
- **Get rid of the Stockpiles**
 - **Prescreen**
 - **Inventory**
 - **Remove chemicals**
 - **Hazardous**
 - **Outdated**
 - **No longer needed**

Short Term Actions

- **For inventory remaining**
 - **Obtain and Maintain Material Safety Data Sheets**
 - **Keep 1 set in lab**
 - **Keep 1 set in office**

Longer Term Goals

- **Develop a chemical management system**
 - Purchase
 - Storage, including labeling
 - Use, including labeling
 - Disposal
 - Emergency Planning – spills, explosions, accidents

Longer Term Goals

- Use safer chemicals & less too
 - Order min quantities, consistent with use
 - Try to keep only 1 year's worth stock
- Prohibit certain chemicals period
(hazard potential outweighs educational potential?)

e.g. IDPH “Dirty Dozen”

- Barium chloride
- Benzene
- Carbon disulfide
- Carbon tetrachloride
- Cyanide compounds
- Formaldehyde
- Hydrofluoric acid
- Mercury & compounds
- Picric acid
- Potassium metal
- Sodium metal
- Thermite

e.g. From King County, WA

- **King County, Seattle, WA, Rehab the Lab, Database of School Chemicals:**

<http://lhwmp.org/HWApp/projects/schools/ChemList.aspx>

Longer Term Goals

- Order “safer” alternatives, packaging, dilutions, kits
 - Green chemistry
 - Microscale approaches (e.g. spot plates instead of test tubes)
- Centralize inventory/purchasing

Longer Term Goals

- Develop and maintain chemical hygiene plan for lab chemicals (*at least*)
- Chemical Hygiene Plan identifies
 - Responsibilities
 - Administration
 - Teachers
 - Students
 - Basic rules and procedures
 - Safety
 - Handling of hazardous materials
 - Spill procedures
 - Waste procedures
 - Training

Longer Term Goals

- Chemical hygiene plans intended for the protection of EMPLOYEES
- Model plan (IL) at http://www.isbe.net/ils/science/pdf/science_safety.pdf
- Inform school or district chemical hygiene plan

Longer Term Goals

- Regularly budget for removals (Cradle to grave)
- Address chemical issues in context with other environmental concerns

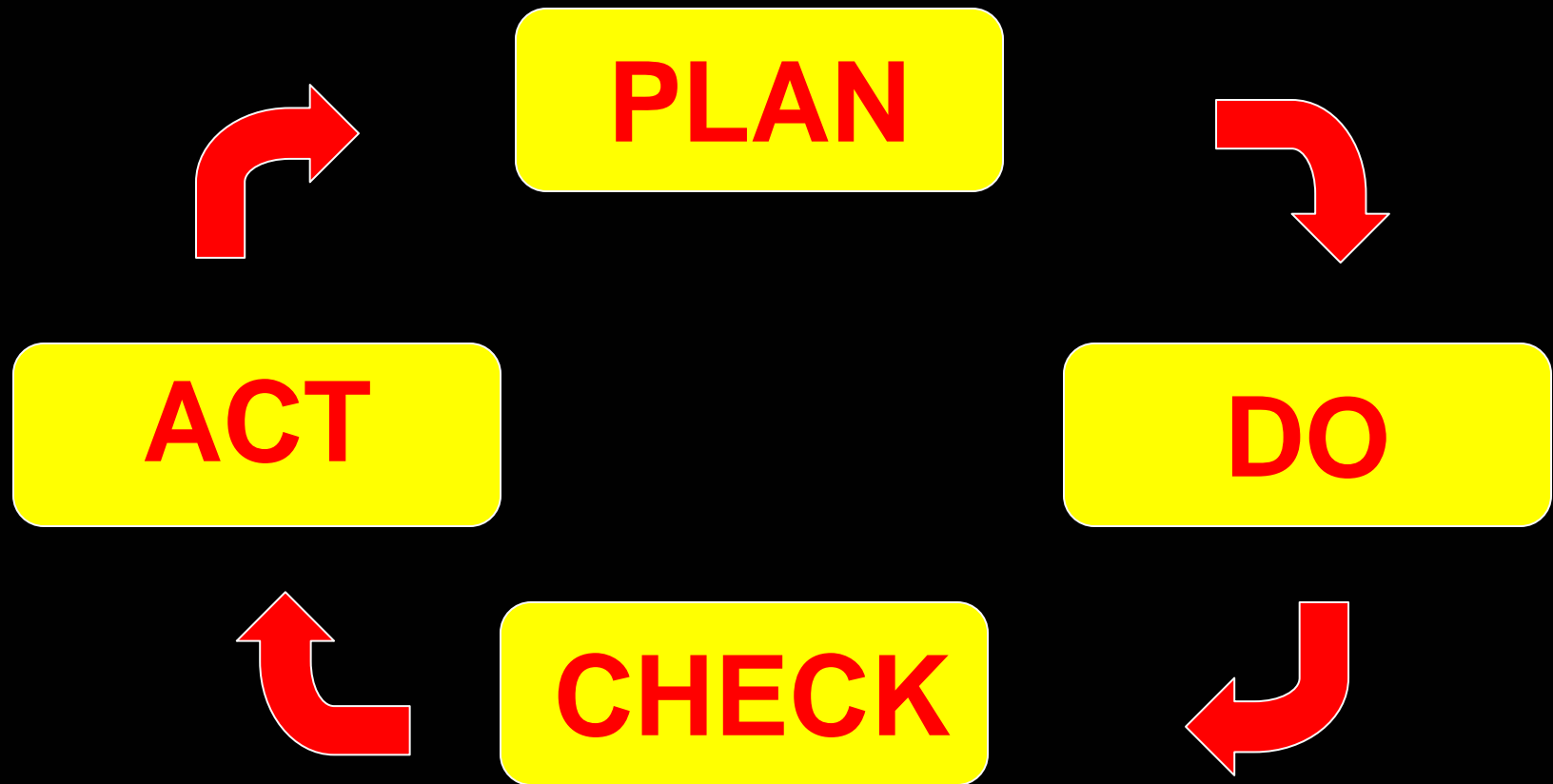
Need To See “The Big Picture”

- **Chemical management can affect**
 - **Safety**
 - **Health**
 - **Indoor Air Quality**
- **Chemical mismanagement can affect**
 - **Drinking Water Quality**
 - **Stormwater Quality**
- **Environmental stewardship**

Need To See "The Big Picture"

- **Look At Chemical Management as part of bigger set of EHS Issues (e.g.)**
 - Poor IAQ
 - Pests /pesticide use
 - Mold
 - Deferral of maintenance
 - Funding
- **Environmental Management Systems (EMS) - puts issues in context & addresses continuous improvement**

Environmental Management System Approach



Special Case : Mercury

- Schools should get rid of mercury
 - Bulk
 - Equipment
- Any Hg spill greater than 1 fever thermometer is a LARGE spill – **get help!**
- Any Hg spill greater than 2 TBS must be reported

Any time one pound or more of mercury is released to the environment, it is mandatory to call the National Response Center (NRC). The NRC hotline operates 24 hours a day, 7 days a week. Call (800) 424-8802. Note that because mercury is heavy, only two tablespoons of mercury weigh about one pound

In Cleaning Up Small Hg Spills

- Never use
 - Broom
 - Vacuum cleaner
- Don't pour down drain
- <http://epa.gov/mercury/spills/index.htm>

Resources

- School Chemistry Laboratory Safety Guide, Consumer Product Safety Commission (www.cpsc.gov) and National Institute for Occupational Safety and Health (<http://www.cdc.gov/NIOSH/>) : <http://www.cdc.gov/niosh/docs/2007-107/pdfs/2007-107.pdf>
- Material Safety Data Sheets <http://www.siri.org/>
- Flinn Scientific <http://www.flinnsci.com/>

More Resources

- Council of State Science Supervisors
 - Making the Connection
 - Science Safety: It's Elementary
 - <http://www.csss-science.org/safety.shtml>
- Rehab the Lab, Safe labs that don't pollute
<http://www.govlink.org/hazwaste/schoolyouth/rehab/>

Still More Resources

- EPA's School Chemical Cleanout Campaign
www.epa.gov/sc3
- EPA's Healthy School Web Portal
www.epa.gov/schools
- EPA's Mercury Web Site
www.epa.gov/mercury
- Mercury in Schools Project
<http://www.mercuryinschools.uwex.edu/>